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(71) Applicant

Orex Limited

(Incorporated in Japan)

Ochanomizu-Kimura Building 2-F, 2-19-3 Soto-Kanda,  
Chiyoda-Ku, Tokyo, Japan

(72) Inventors

Osamu Aizawa

Mitsuo Yoshikawa

Kaisaku Akabane

Hiroyuki Katohda

(74) Agent and/or Address for Service

Marks & Clerk

Suite 301, Sunlight House, Quay Street, Manchester,  
M3 3JY, United Kingdom

## (54) Greetings card with voice recorder/reproducer

(57) A recorder/reproducer (7) for recording and reproducing digital voice signals is sealed in an envelope portion (3) of a greetings card (1). The recorder/reproducer (7) has a voice message input section to which there is connected a cable (5) extending from within the envelope. A plug serving as an input terminal for digital voice signals is disposed on one end of the cable. After a desired voice message has been recorded in the recorder/reproducer through the cable, the cable can be cut off.

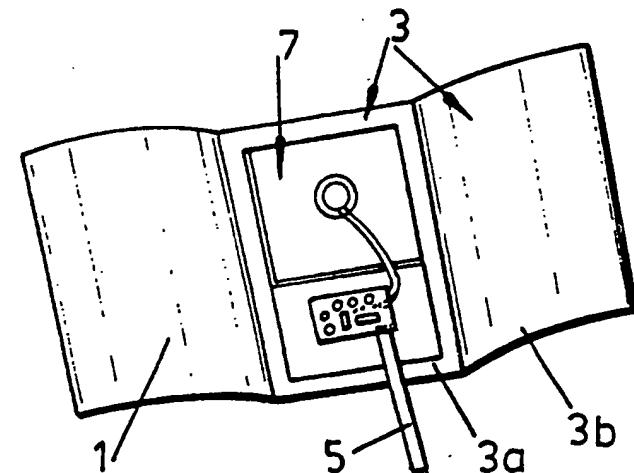
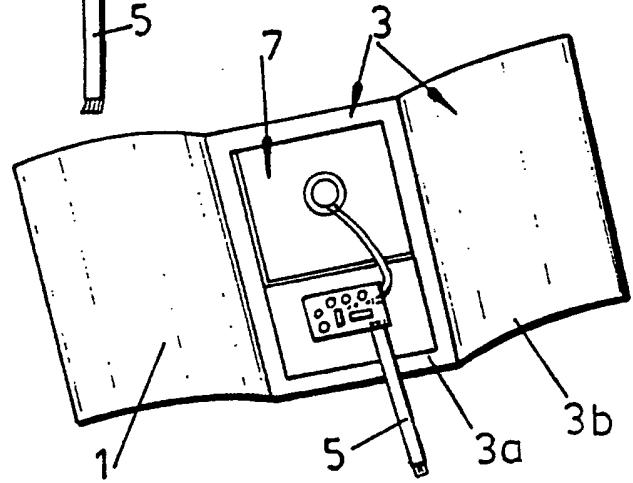
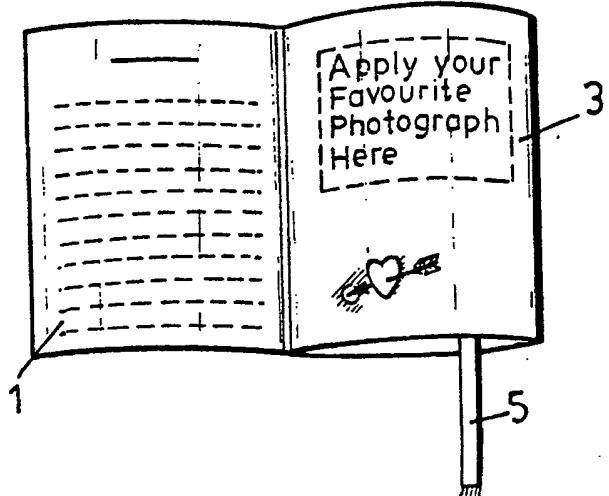
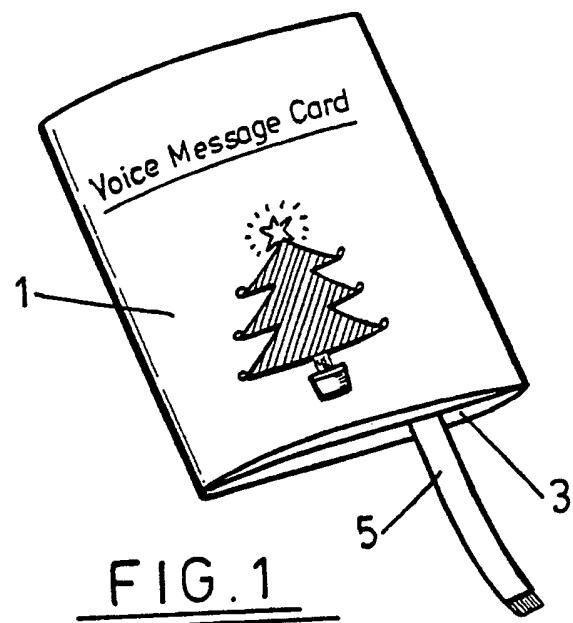


FIG. 3



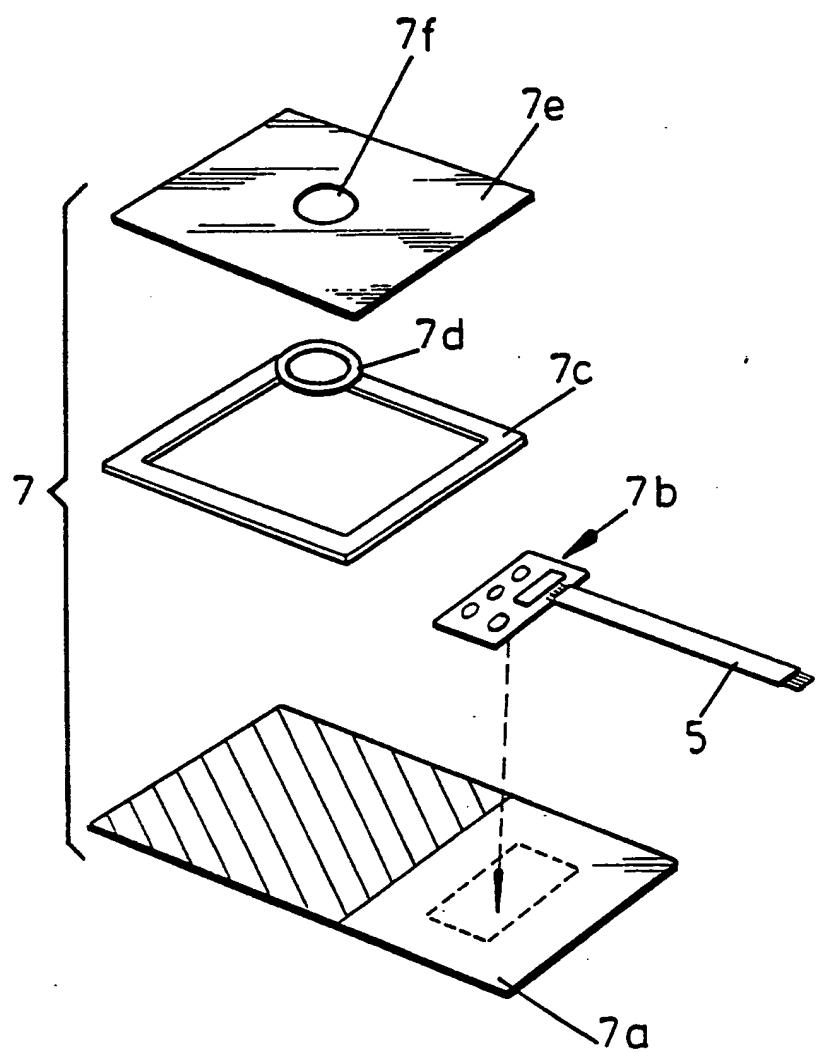
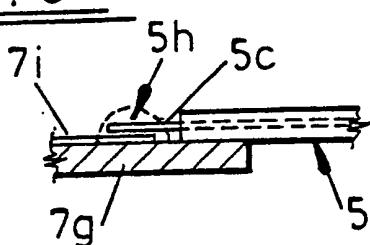
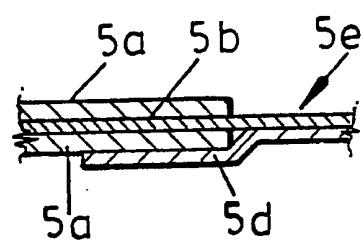
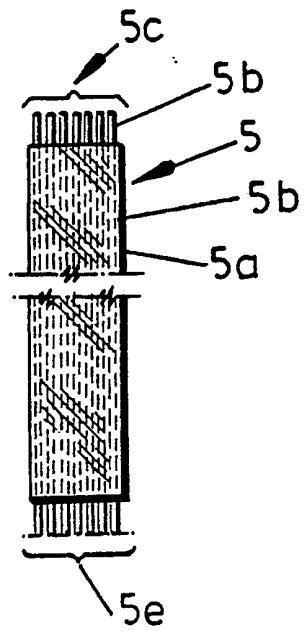


FIG. 4



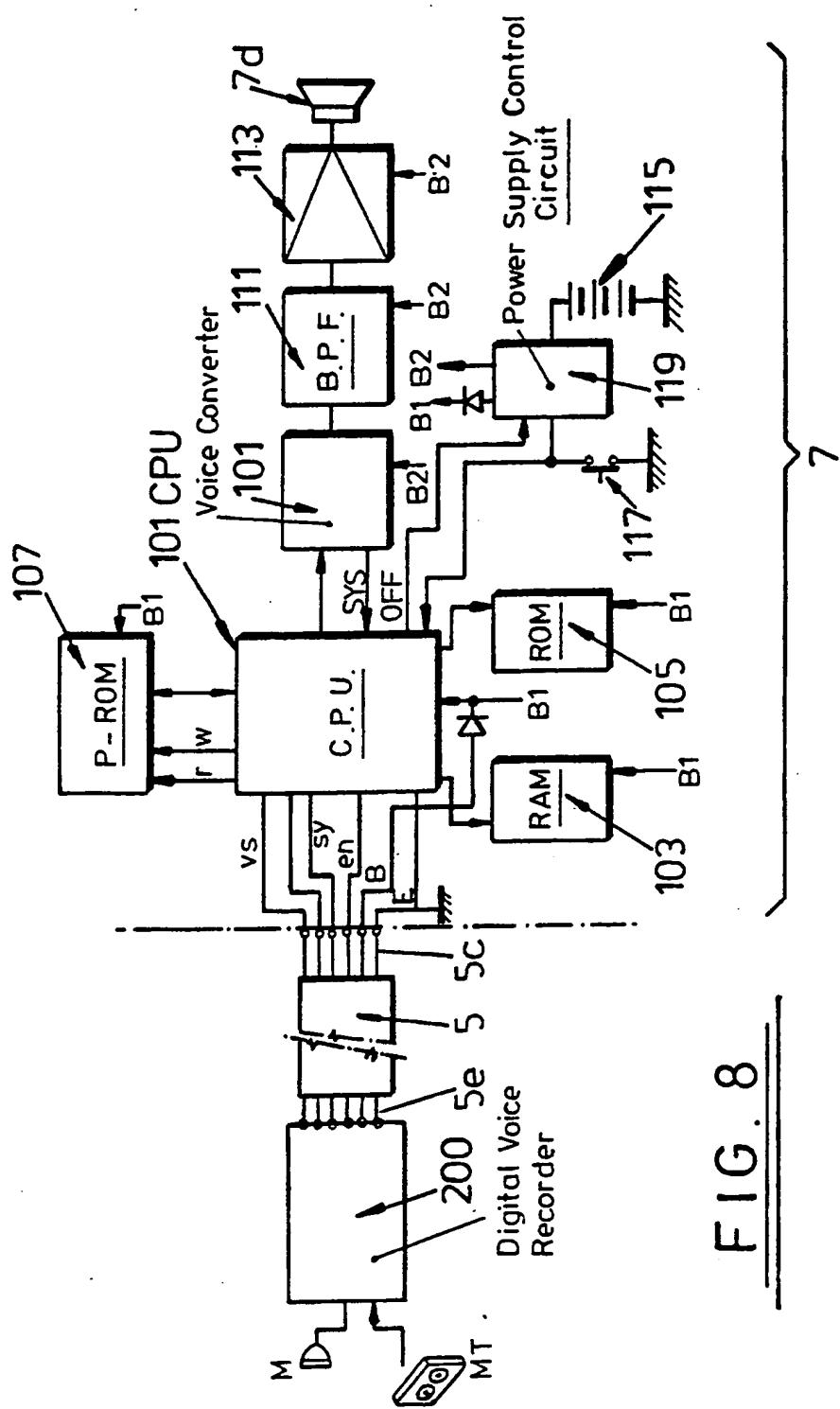


FIG. 8

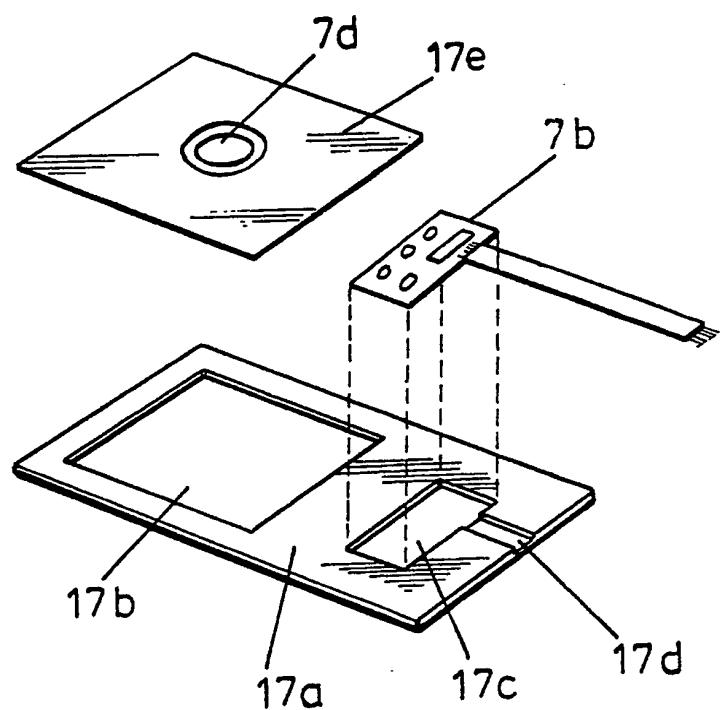


FIG. 9

## VOICE MESSAGE CARD

## BACKGROUND OF THE INVENTION

## Field of the Invention:

The present invention relates to a voice message card for reproducing recorded voice sounds, and more particularly to a voice message card which carries the voice message of a sender that is recorded in a voice message recorder in the card, and which can reproduce the recorded voice message when desired by a receiver of the card.

## Description of the Prior Art:

Exchange, through the mail, of greetings cards on Christmas, birthdays of relatives and close friends, and other celebratory occasions is a widespread custom throughout the world. With the development of electronic technology, it was once customary to record the voice of a sender as an analog signal on a recording medium such as a magnetic tape, mail the recording medium to a receiver, and to reproduce the recorded voice with a recorder/reproducer of the receiver. However, this form of message exchange did not gain much popularity because the receiver had to use a recorder/reproducer in order to reproduce the recorded voice message from the recording medium and also because the postal fee was relatively high and care had to be exercised to handle the recording medium as it was much larger and heavier than ordinary greetings cards.

Recent miniaturization of electronic devices has resulted in small-size recording mediums and recorder/reproducers. There have been developed and put to use various devices in the form of cards which accommodate recording mediums and recorder/reproducers. For example, Japanese Laid-Open Utility Model Publication No. 63(1988)-153299 discloses a message card having a voice memory circuit, a voice input terminal connectable to a microphone, a speaker, a voice input/output power supply, input and output amplifiers, and a voice message output switch. These components of the message card are supported on a single thin substrate. When a voice message is entered through the microphone, it is converted into an electric signal and stored in the voice memory circuit. The stored message can be reproduced from the speaker when the voice message output switch is pressed.

Japanese Laid-Open Utility Model Publication No. 1(1989)-166000 discloses a voice storing and reproducing device in the form of a card similar to the message card shown in the first publication. The voice storing and reproducing device can store 20 messages, and a desired one of the stored messages can be selected and heard by a receiver using a switch.

The conventional devices disclosed in the above publications incorporate only a reproducer assembled in a single substrate, and serve as a card-shaped reproducing

device for producing voice messages by itself. The disclosed devices do not have any recorder for recording voice messages therein.

The known card-shaped reproducing devices have a voice recording input terminal unit on a side of the card. To record a voice message in the card-shaped reproducing device, the input terminal unit is inserted into the receptacle of a separate recorder, and a desired voice message is recorded in the card-shaped reproducing device by the recorder. After the voice message is recorded, the card-shaped reproducing device is removed from the recorder so that the input terminal unit is disconnected therefrom. If the card-shaped reproducing device is to be irremovably sealed in a foldable paper card and sent from a sender to a receiver, the sender has to record a voice message in the card-shaped reproducing device before it is sealed in the foldable paper card. Since the card-shaped reproducing device is not irremovably sealed in the foldable paper card unless the voice message is recorded beforehand in the card-shaped reproducing device, it is impossible for a retailer to sell an unrecorded card-shaped reproducing device already sealed in a foldable paper card and subsequently for a user to record a desired voice message in the card-shaped reproducing device and to mail the recorded card-shaped reproducing device. Furthermore, since the voice recording input terminal unit of the card-shaped reproducing device is large

in size, when the voice recording input terminal unit is put into the foldable paper card, forming a voice message card, the resultant voice message card becomes relatively thick. The voice message card is also expensive because the input terminal unit is expensive.

#### SUMMARY OF THE INVENTION

In view of the aforesaid drawbacks of the conventional voice message cards, it is a first object of the present invention to provide a voice message card which allows a sender to record a desired voice message in a card-shaped reproducing device that has already been irremovably sealed in a foldable thin sheet on which a message can be written.

Another object of the present invention is to provide a voice message card which allows a voice message to be recorded in a card-shaped reproducing device, free of a terminal unit, which has already been irremovably sealed in a foldable thin sheet on which a message can be written.

Another object of the present invention is to provide a voice message card from which a voice message input cable can be removed after a voice message is recorded in a card-shaped reproducing device that has already been irremovably sealed in a foldable thin sheet on which a message can be written.

According to the present invention, there is provided a voice message card for reproducing a recorded voice message, comprising a flexible foldable thin sheet including

an envelope portion, a recorder/reproducer for recording and reproducing digital voice signals, the recorder/reproducer being sealed in the envelope portion and having a voice message input section, a cable connected to the voice message input section and extending outwardly from within the envelope portion, and a plug disposed on one end of the cable and serving as an input terminal for digital voice signals to be recorded in the recorder/reproducer.

The voice message card with the recorder/reproducer unrecorded and sealed in the envelope portion is offered for sale. After having purchased the voice message card, the purchaser can record a desired voice message in the recorder/reproducer. A message composed of letters can also be written on the flexible foldable thin sheet. Therefore, the voice message card can be used in a variety of different applications. The portion of the cable which extends out of the envelope portion can be severed off after the voice message has been recorded. Accordingly, the voice message card can be handled with ease when it is mailed. Because the voice message card is free of any conventional terminal unit, it is thinner and more inexpensive to manufacture.

The above and other objects, features and advantages of the present invention will become more apparent from the following description when taken in conjunction with the accompanying drawings in which preferred embodiments of the present invention are shown by way of illustrative example.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a voice message card according to the present invention;

Fig. 2 is a perspective view of the voice message card with its cover open;

Fig. 3 is a perspective view of the voice message card with its envelope portion cut open;

Fig. 4 is an exploded perspective view of a recorder/reproducer of the voice message card;

Fig. 5 is a fragmentary front elevational view of a flat cable of the voice message card;

Fig. 6 is an enlarged cross-sectional view of the flat cable;

Fig. 7 is an enlarged cross-sectional view of a conductor connector;

Fig. 8 is a block diagram of the recorder/reproducer; and

Fig. 9 is an exploded perspective view of a recorder/reproducer according to another embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Fig. 1 shows a voice message card according to the present invention. The voice message card includes a foldable thin sheet of relatively thick paper or flexible synthetic resin, the thin sheet comprising two folds, one serving as a cover 1 and the other as an envelope portion 3.

The voice message card also has a separable flat cable 5 (described later on) extending from within the envelope portion 3. The surface of the cover 1 is marked with letters which read "Voice Message Card" in its upper portion and bears a printed picture below the letters. When the cover 1 is turned over, the reverse side of the cover 1 is positioned on the lefthand side of the two facing pages and is marked with ruled lines for writing a message thereon. The envelope portion 3 is positioned on the righthand side of the two facing pages and composed of two sheet folds 3a, 3b (FIG. 3) pasted or sealed into an envelope structure. The envelope portion 3 may be printed with a citation from the Bible or the like and has an upper area where a photograph may be applied. The envelope portion 3 also has, on a lower portion thereof, a mark which indicates the position of the push button of a switch for energizing a recorder/reproducer (described later on) and an indication showing that the mark represents the push button of the switch.

Fig. 3 illustrates the envelope portion 3 as it is cut open. A recorder/reproducer 7 having a thin planar shape is fixedly mounted in the envelope portion 3.

The recorder/reproducer 7 is shown in greater detail in Fig. 4. The recorder/reproducer 7 includes a base plate 7a, a recorder/reproducer unit 7b, a spacer 7c, a ceramic spacer 7d, and a resonant plate 7e. The base plate 7a is made of moderately rigid paper or synthetic resin.

The recorder/reproducer unit 7b comprises a plurality of electronic parts mounted on a printed-circuit board. The flat cable 5, which serves to transmit voice data to the recorder/reproducer unit 7b, is connected to a voice message input section of the printed-circuit board. The structural details and operation of the recorder/reproducer unit 7b will be described later on. The spacer 7c is made of paper and is in the shape of a centrally open square frame. The ceramic speaker 7d is of a flat circular configuration. The resonant plate 7e comprises a thin flat sheet of hard synthetic resin and has a central circular hole 7f over which the ceramic speaker 7d is attached. The circular hole 7f has a diameter which is slightly smaller than the outside diameter of the ceramic speaker 7d.

The process of assembling the recorder/reproducer 7 will be described below with reference to Fig. 4.

An electrically insulative adhesive is coated on the reverse side of the recorder/reproducer unit 7b. Thereafter, the recorder/reproducer unit 7b is bonded to an area of the base plate 7a which is indicated by the dotted line. Then, the spacer 7c is bonded to a hatched area of the base plate 7a.

Subsequently, the ceramic speaker 7d is attached to the reverse side of the resonant plate 7e over the central circular hole 7f. The resonant plate 7e with the ceramic speaker 7d is then glued to the spacer 7c.

Finally, leads (see FIG. 3) are connected between the recorder/reproducer unit 7b and the ceramic speaker 7d, whereupon the recorder/reproducer 7 is completely assembled.

As shown in FIG. 3, the recorder/reproducer 7 thus assembled is glued to the fold 3a of the envelope portion 3 adjacent to the cover 1, and then the other fold 3b is folded over the fold 3a in covering relation to the recorder/reproducer 7. The peripheral edge of the fold 3b is glued to the peripheral edge of the fold 3a. In this manner, the voice message card is assembled. The flat cable 5 extends outwardly from the voice message card, as shown in FIG. 1.

As shown in FIG. 5, the flat cable 5 comprises a plurality of parallel strip-like conductors 5b embedded in a support web 5a made of flexible synthetic resin such as ABS resin or vinyl resin. The flat cable 5 has on one end a conductor connector 5c which comprises exposed ends of the strip-like conductors 5b with the support web 5a peeled off. As shown in FIG. 6, the flat cable 5 has on the other end a plug 5e which also comprises exposed ends of the strip-like conductors 5b with the support web 5a peeled off and a supporter 5d of synthetic resin which is attached to the reverse sides of the conductors 5b and the support web 5a. As shown in FIG. 7, the conductor connector 5c is joined by a solder 5h to a conductor plate 7i on the printed-circuit board, denoted at 7g, of the recorder/reproducer unit 7b.

Since the flat cable 5 is of a thin web configuration, it can freely be cut off by a cutter such as a knife or scissors. The cable may however be of a circular cross section insofar as it can easily be cut off.

The recorder/reproducer 7 will be described below with reference to FIG. 8.

As shown in FIG. 8, the recorder/reproducer 7 includes a CPU 101 for controlling recording and reproducing operation of the recorder/reproducer 7. A RAM 103 is connected to the CPU 101 and serves as a working memory for the CPU 101. A ROM 105 which is also connected to the CPU 101 stores a control program for controlling the CPU 101. A P-ROM 107 is also connected to the CPU 101 and serves to store voice data in the form of digital signals. A voice converter 109 is connected to the CPU 101 for converting digital voice data read from the P-ROM 107 into analog signals. A bandpass filter 111 is connected to the voice converter 109 for passing only those voice signals which have frequencies ranging from 100 to 2,500 cycles per second. A voice amplifier 113 amplifies the voice signals which have passed through the bandpass filter 111. The voice amplifier 113 has an output terminal connected to the ceramic speaker 7d. The various components, described above, of the recorder/reproducer 7 are supplied with electric energy from a battery 115 which is controlled by a power supply control circuit 119 that can be operated by a

normally open start switch 117. The power supply control circuit 119 has a built-in timer which operates the power supply control circuit 119 for a preset period of time necessary to read digital voice data from all memory areas of the P-ROM 107 in response to depression of the start switch 117, and then automatically turns off the power supply control circuit 119 after elapse of the preset period of time.

A digital voice recorder 200, which is connectable to the flat cable 5, serves to record digital voice data in the recorder/reproducer 7. The digital voice recorder 200 may be of any of various structures insofar as it can produce digital voice data as an output signal.

A process of recording digital voice data in the recorder/reproducer 7 will briefly be described below.

In order to record digital voice data, an operating voltage is applied from the digital voice recorder 200 through a power supply line B of the flat cable 5 to the CPU 101, the RAM 103, the ROM 105, and the P-ROM 107 of the recorder/reproducer 7, and an ENABLE signal is also applied from digital voice recorder 200 through an ENABLE signal line en of the flat cable 5 to the CPU 101. In response to the ENABLE signal, the CPU 101 reads a setup program from the ROM 105 and executes the setup program, thereby applying a write signal w to the P-ROM 107 to make the P-ROM 107 ready for writing data therein, so that the recorder/reproducer 7 is readied for recording digital voice data.

When a first synchronizing signal SY is applied from the digital voice recorder 200, the RAM 103 is cleared, and immediately thereafter, one block of digital voice signal is supplied from a voice signal line VS of the flat cable 5 to the CPU 101. The digital voice signal is read into the RAM 103 which has been cleared by the synchronizing signal SY. In response to a second synchronizing signal SY, an address counter in the CPU 101 is set to a first address "0". When the first address "0" is indicated to the P-ROM 107 by the address counter, the CPU 101 transfers the stored block of digital voice signal from the RAM 103 to the P-ROM 107, which writes the transferred block of digital voice signal at the address "0". After the block of digital voice signal is read from the RAM 103, a next one block of digital voice signal is supplied from the voice signal line VS to the CPU 107 and stored in the RAM 103.

On arrival of a third synchronizing signal SY, the address counter in the CPU 101 is incremented by "1" and hence set to a next address "1". When the second address "1" is indicated to the P-ROM 107 by the address counter, the CPU 101 transfers the stored block of digital voice signal from the RAM 103 to the P-ROM 107, which writes the transferred block of digital voice signal at the address "1". Thereafter, a next one block of digital voice signal is supplied from the voice signal line VS to the CPU 107 and stored in the RAM 103.

The above sequence of recording operation is repeated until a desired number of digital voice signals are written in the P-ROM 107.

Even after the entire recording operation is completed, the address counter continues to be incremented until a carry signal is produced by the address counter. When the carry signal is issued, the CPU 101 detects the carry signal, clears the address counter, and turns off the power supply. The recording process is now finished.

A process of reproducing stored voice data will be described below.

When the start switch 117 is momentarily depressed, the power supply control circuit 119 is operated to supply electric energy from the battery 115 to all the circuits of the recorder/reproducer 7.

In response to the depression of the start switch 117, the CPU 101 reads the setup program stored in the ROM 105 and executes the setup program. With the start switch 117 turned on, the CPU 101 enters a reproducing mode of operation.

When the electric energy from the battery 115 is supplied to the voice converter 109, the voice converter 109 sends a first synchronizing signal SYS to the CPU 101. The RAM 103 is now cleared and the address counter in the CPU 101 is set to the first address "0". The first address "0" is indicated to the P-ROM 170 by the address counter, and a

read signal r is applied from the CPU 101 to the P-ROM 107, which then reads the first block of stored digital voice signal into the CPU 101. The CPU 101 then stores the first block of digital voice signal in the cleared RAM 103. When a second synchronizing signal SYS is supplied, the CPU 101 reads the stored block of digital voice signal from the RAM 103 and sends it to the voice converter 109. Upon arrival of the second synchronizing signal SYS, the address counter in the CPU 101 is incremented by "1" and set to the next address "1". Therefore, the next address "1" is indicated to the P-ROM 107 by the address counter. Thereafter, i.e., after the first block of digital voice signal has been sent from the RAM 103 to the voice converter 109, the CPU 101 reads the second block of digital voice signal from the first address in the P-ROM 107 and stores it in the RAM 103.

The digital voice signal sent to the voice converter 109 is converted into an analog voice signal, which is applied to the bandpass filter 111. The analog voice signal then passes through the bandpass filter 111 and is amplified by the voice amplifier 113. The amplified analog voice signal is then reproduced into a voice message by the ceramic speaker 7d.

The above reproducing process is continuously carried out until all the digital voice signals stored in the P-ROM 107 are read out. Even after the reproducing process is completed, the address counter is continuously inc-

mented until it produces a carry signal. When the carry signal is produced by the address counter, it is detected by the CPU 101, which instructs the power supply control circuit 119 to turn off the power supply. The reproducing process is now fully finished.

The recorder/reproducer 7 is not limited to the illustrated arrangement, but may be of any of various digital recorder/reproducers.

When the voice message card assembled as shown in FIG. 1 is brand-new, no voice message is recorded in the recorder/reproducer 7. The brand-new voice message card is offered for sale in stationers and department stores.

Stationers and department stores which sell brand-new voice message cards are equipped with the digital voice recorder 200 for recording voice messages in voice message cards that are sold. A person who has purchased a voice message card can have a desired voice message recorded in the voice message card using the digital voice recorder 200, as follows:

The purchaser of the voice message card says the message toward a microphone M of the digital voice recorder 200, or plays back a magnetic tape MT which has recorded the message in a cassette replay unit of the digital voice recorder 200, so that the desired message is stored in a voice recording unit in the digital voice recorder 200. Then, the operator determines whether the length of the

recorded message is shorter than the maximum recording time of the voice message card, and also whether the audio quality of the voice message is higher than a predetermined level, i.e., the recorded voice message could be reproduced from the voice message card with a certain audio quality higher than a predetermined audio quality. After such a checking process, the plug 5e of the flat cable 5 extending from the voice message card is inserted into a receptacle of the digital voice recorder 200. Then, the digital voice recorder 200 transmits digital voice signals, which have been converted from the recorded voice message, to the recorder/reproducer 7 of the voice message card in which the transmitted digital voice signals are semipermanently recorded. After the voice message has been recorded in the voice message card, the flat cable 5 is no longer necessary. Therefore, the flat cable 5 is pulled out of the digital voice recorder 200, and that portion of the flat cable 5 which extends out of the voice message card is cut off by a cutter such as a knife or scissors. Subsequently, a desired photograph may be applied to the voice message card, and then the voice message card is put into an envelope and mailed to a receiver.

The receiver, having received the mailed voice message card, removes the voice message card from the envelope, turns over the cover 1, and presses the switch-marked area on the lower portion of the envelope portion 3 on the

righthand page of the voice message card. The recorder/reproducer 7 is now energized to reproduce the recorded voice message through the ceramic speaker 7d, so that the receiver can hear the reproduced voice message. Since the ceramic speaker 7d is attached to the resonant plate 7e, the reproduced voice sounds generated by the ceramic speaker 7d are amplified as resonant sounds.

Fig. 9 shows a recorder/reproducer according to another embodiment of the present invention. The recorder/reproducer shown in Fig. 9 has a base plate 17a of moderately rigid paper or synthetic resin. The base plate 17a has a rectangular through hole 17b defined in an upper half portion thereof, and a shallow rectangular recess 17c and a groove 17d which are defined in a lower half portion thereof, the groove 17d communicating with the recess 17c. The recorder/reproducer also includes a recorder/reproducer unit 7b which is identical to the recorder/reproducer unit shown in Fig. 4. A resonant plate 17e comprises a thin flat sheet of hard synthetic resin and has a central circular hole over which a ceramic speaker 7d, identical to the ceramic speaker shown in Fig. 4, is attached. The resonant plate 17e with the ceramic speaker 7d attached is glued to the base plate 17a over the hole 17b. The recorder/reproducer unit 7b is positioned and glued in the recess 17c, and a flat cable 5, which is identical to the flat cable shown in Fig. 4, is fitted in the groove 17d. The

recorder/reproducer shown in Fig. 9 is slightly thinner than the recorder/reproducer shown in Fig. 4.

Although certain preferred embodiments have been shown and described, it should be understood that many changes and modifications may be made therein without departing from the scope of the appended claims.

Claims:

1. A voice message card for reproducing a recorded voice message, comprising:

a flexible foldable thin sheet including an envelope portion;

a recorder/reproducer for recording and reproducing digital voice signals, said recorder/reproducer being sealed in said envelope portion and having a voice message input section;

a cable connected to said voice message input section and extending outwardly from within said envelope portion; and

a plug disposed on one end of said cable and serving as an input terminal for digital voice signals to be recorded in said recorder/reproducer.

2. A voice message card according to claim 1, wherein said cable comprises a flat cable.

3. A voice message card according to claim 2, wherein said flat cable is severable by a cutter.

4. A voice message card according to claim 1, wherein said plug comprises exposed conductors of said flat cable at said one end thereof.

5. A voice message card according to claim 1,  
wherein said flexible foldable thin sheet is made of paper.

6. A voice message card according to claim 5,  
wherein flexible foldable thin sheet of paper has an area  
where a message can be written.

7. A voice message card according to claim 1,  
wherein said recorder/reproducer is originally unrecorded  
with any digital voice signals.

8. A voice message card according to claim 1,  
wherein said recorder/reproducer includes a flat ceramic  
speaker.

9. A voice message card according to claim 8,  
wherein said recorder/reproducer further includes a resonant  
plate, said ceramic speaker being mounted on said resonant  
plate.

10. A method of preparing a voice message card comprising the steps of:

providing a card having a recorder/reproducer sealed within an envelope portion of the card and a cable of the recorder/reproducer extending outside of the card;

storing a message in a message storage device;

coupling the cable to the message storage device to transfer the message stored in the message storage device to the recorder/reproducer ; and

uncoupling the cable from the message storage device.

11. The method of claim 10, comprising the further step of cutting the cable so that the cable does not extend outside of the card after the step of uncoupling the cable from the message storage device.

12. The method of claim 10, wherein the message storage device comprises a digital voice recorder and the step of storing a message in a message storage device includes the step of speaking into a microphone coupled to the digital voice recorder.

13. The method of claim 10, wherein the message storage device comprises a digital voice recorder and the step of storing a message in a message storage device includes the step of coupling a recorder having a message stored therein to the digital voice recorder.

14. The method of claim 10, wherein the step of storing a message in a message storage device is followed by the steps of determining that a message stored in the message storage device is shorter than a predetermined maximum recording time and at least equal to a predetermined quality level.

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